

‘The Familiar’: technology-being-with-us

Indae Hwang

Faculty of Art Design and Architecture,
Monash University
indae.hwang@monash.edu

Mark Guglielmetti

Faculty of Art Design and Architecture,
Monash University
mark.guglielmetti@monash.edu

Vince Dziekan

Faculty of Art Design and Architecture,
Monash University
vince.dziekan@monash.edu

Abstract

Digital technologies pervade contemporary life, so much so that the boundary between the physical and virtual world has become increasingly blurred as digital technologies are embedded ‘seamlessly’ into our constructed environment. Consequentially, our awareness of the presence and tangible qualities of computational systems disappears – as these technologies merge inseparably with physical reality. This phenomenon is a direct consequence of *ubiquitous computing*. In this paper we investigate how cultural perception influences the ways we understand and approach the application of ubiquitous computing and its related technologies – such as electronic sensors, camera vision and radio frequency identification (RFID) – in creative practice. Through attempting to articulate the conditions that give rise to a distinctively ‘Western’ apprehension of digital media, this investigation aims to establish a basis from which an alternative interpretation of computational systems might be explored; one that may defamiliarize digital technologies by adopting an ‘Eastern’¹ perception of our digital nature as ‘technology-being-with-us’.

Familiar (adjective): often encountered or experienced; common [3]

The increasing ‘disappearance’ of computational technologies into everyday objects has inspired research and development focused on the potential to reconfigure the ways that we, as humans, relate to computers and their associated computational systems. This field of research is known as *ubiquitous computing*. In a ubiquitous computing framework computation is incorporated into the practices of everyday life in ways that do not require users to make a self-conscious effort to adapt their activities in order to accommodate these resulting systems. [4] Researchers in ubiquitous computing seek to distribute computers into our

everyday lives in such a way as to render them invisible. This relatively recent condition² transforms the ways in which we interact with computer systems as well as where and how we relate to them.

The unifying goal of ubiquitous computing researchers since 1988 can be summarized as making the intersection between humans and computational systems invisible. [5] The ubiquitous quality of digital processes is located not only “everywhere” but also found in “everything” that we use and interact with as part of our daily lives. [6] Ubiquitous computing’s potential modality for interaction is based on the idea that within such a computational environment, in which “everywhere” and “everything” converges, interaction can seemingly occur naturally without the user noticing the diverse ‘invisible’ computational processes being called upon.

The seamless, transparent and invisible incorporation of digital technologies into our everyday objects and environments produces the illusion that digital technology is somehow “phantomlike”. [7] This illusion leads us to regard digital technologies as if they were “transparent conduits for immaterial, informational contents” rather than “concrete, material, and present-with-us” elements. [8] Even though ubiquitous computing seeks to blend digital technologies with material environments, this approach risks bringing about a discontinuity between the two domains. By hiding the materiality of digital technologies and instead prioritizing their informational or mediated contents [9] ubiquitous computing reduces our awareness of these digital technologies as material entities enmeshed in our everyday practices.

This brief account of ubiquitous computing is informed by a familiar and very specific narrative. The tendency to regard digital technologies as efficient tools is commonplace – at least as accounted for predominantly in ‘the West’. [10] This deference to digital technologies as tools that assist humans and

¹ We use the term ‘Eastern’ as shorthand to loosely describe countries in East Asia. Our use is not intended to conflate the complex array of diverse cultural socio-political practices or complex consumption of media experiences in this region into a homogeneous and imaginary ‘Oriental lump’ but to remind the reader “geopolitically-driven cultural Othering dies hard” [1 see also 2].

² The term ubiquitous computing was coined by Mark Weiser circa 1988 whilst he was Chief Technologist at Xerox Palo Alto Research Center.

manage their work and domestic activities affects the way in which digital technologies are deployed in our lived environment, along with the promise for how every device will not only be ultimately be connected as part of the *Internet of Things*. [11] These inclinations lead us to believe that digital devices and systems are basically benign, easily consumed and effortlessly upgradable, largely disposable, as well as exceedingly pragmatic and functional.

As counterpoint to this predominant narrative, Bertram Bruce and Maureen Hogan argue that in order to understand the nature of technologically mediated existence, we should look more carefully at how computational systems affect our lives, especially when we cannot see the systems directly. [12] Accordingly: “the more we look at technologies the more technologies [are absorbed] into the background. Despite our attention, we lose sight of the way [technologies] give shape to our daily lives”. [13]

The pervasive presence of digital technologies that results from incorporating embedded, contactless digital technologies such as RFID into objects and throughout the constructed environment can lead us to overlook the complex relations that exist between human beings and the contemporary socio-cultural milieu in which we live. The major implication of the technological transformation wrought by ubiquitous computing can be summarized as follows: the direct connection between humans and computational processing is transformed from *obvious* to *oblivious*. By rendering digital technologies transparent and invisible, we take them for granted; and in so doing, we risk becoming oblivious to a sense of ‘technology-being-with-us’.

Designers Dunne and Raby argue that an increased understanding of Hertzian space – what they describe as a landscape of electronic products that create “a new, invisible but physical environment” [14] – renders users acutely aware that technology goes beyond the merely visible technological object and encompasses the practices, economies and ideologies encoded into technological artifacts. Illustratively, this notion is particularly apparent in Apple’s ‘iOS ecology’. In this technological ecosystem, design products such as iPhones, iPods and iPads are material components that we use physically while the operating system that unifies these artifacts is immaterial.

Representing digital technologies as devices or gadgets that efficiently manage our productivity in the workplace and optimize our leisure time is not a new phenomenon. In *Machine in the Garden*, Leo Marx observes that in society, “technologies are habitually represented by ‘things’ – by their most conspicuous artifactual embodiments”. [15] According to Marx, assigning technologies to “the realm of things... distracts attention from the human–socio economic and political relations which largely determine who uses them and for what purposes”. [16] This distraction leads to a common belief that technology facilitates a better future for humans when, in reality, it “is matched by our increasing reliance on instrumental standards of judgment, and a

corresponding neglect of moral and political standards, in making judgments about the direction of society”. [17]³

In contemporary society, electronic technologies – and by extension digitally mediated systems – are informed by an uncritical acceptance of what historian Bernard Waites refers to as “American Ideology” or an “ideological legitimization of technology” [19]:

All problems whether of nature, human nature, or culture, are seen as ‘technical’ problems capable of rational solution through the accumulation of objective knowledge, in the form of neutral or value-free observations and correlations, and the application of that knowledge in procedures arrived at by trial and error, the value of which is to be judged by how well they fulfill their appointed ends. These ends are ultimately linked with the maximization of society’s productivity and the most economic use of its resources, so that technology, in the American Ideology, becomes ‘instrumental rationality’ incarnate, the tools of technocracy. [20-21]

This sentiment is echoed by Evgeny Morozov’s incisive observation that in large part it is the ideological reform agenda of Silicon Valley’s “ameliorative experiment” [22] that currently fits “us all into a digital straightjacket by promoting efficiency, transparency, certitude, and perfection” [23] at the risk of losing our capacity for moral judgment in a world of risk adverse cultural institutions. [24]

The manner in which digital technologies are integrated into society is influenced by cultural and sub-cultural imperatives. In large part, it is through specific European and American-centric epistemologies that digital media systems have been predominantly refracted to date. In contemporary Western culture, the specific conditions that render digital technologies transparent and invisible defer our realization that digital technology is *always* with us. Digital technology is frequently considered either in terms of hardware or as software. This dichotomy obscures our perceptual experience of ‘technology-being-with-us’, making it difficult to maintain an awareness of the intermingled relationships that we have with digital technologies because such a culturally reinforced perception shifts technology from the foreground to the background of our consciousness.

Familiar Unfamiliar

It is important to understand the types of relationships we have with digital technology to appreciate how human-computer interrelationships are dynamically transformed. Notwithstanding the major cultural implications such dynamic transformation heralds, it is

³ Evgeny Morozov reminds us that it is Bruno Latour who writes, “[t]he moral law is in our hearts, but it is also in our apparatuses.” [18]

paradoxical that as we form increasingly intimate relationships with computational technologies, we become increasingly unaware of their existence. This process of familiarization is exaggerated through the various cultural systems that render these technologies transparent and invisible.

The consequence of these technologies becoming familiarized is that complex relationships between humans and digital technology are no longer consciously foregrounded, as they perhaps once were. In "*Steps to an Ecology of Mind*, Gregory Bateson argues that familiarized objects and environments "are sunk into the unconscious levels" to keep our consciousness from focusing on the "pragmatics of particular instances". [25] In short, familiarized objects and environments receive little attention from users. For Bateson, this 'little attention' helps us to forget that our membership in the world is complex. It is a membership in which the "human individual", the "society in which individual lives", and the "ecosystem – the natural biological surroundings of human animals" – are intermingled. [26] In the 'ecosystem' we now inhabit, we frequently take digital technologies for granted by overlooking the complex relationships we form with them and therefore run the risk of losing our sense of 'technology-being-with-us'.

In an attempt to re-foreground digital technology into the human psyche, the process of defamiliarization can be employed to recall an awareness of 'technology-being-with-us'. Literary theorist and scholar Viktor Shklovsky originally developed the concept of defamiliarisation to distinguish between poetic and prosaic languages. [27] Shklovsky argued that the process of defamiliarization – of making the familiar unfamiliar – increases "the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged". [28] Applications of defamiliarization have been fundamental to the artistic strategies of key Modernist artists such as Rene Magritte and Marcel Duchamp, as well as being a guiding principal of Nam June Paik's aesthetic response to art, media and technology. Defamiliarization enables us to refocus our attention back to a familiar object. In doing so, we are better able to reconsider the particular relationships that the familiar object has within its social milieu and with us. In an era in which HCI design strategy places an emphasis upon making digital technologies transparent for users to accomplish specific tasks more efficiently and economically, defamiliarizing a technology can instead encourage the viewer or user to become more acutely aware of their relationship with technology outside of any predetermined practical or functional usages. If HCI and user-centered design strategies valorize making users less aware of the technology by (over)familiarizing it, the defamiliarization of technology creates the opportunity to reflect on particular cultural activities to help illuminate the interdependent nature of the relationship between technology and human nature – wherein technology is viewed as not merely a tool for us to use

but as non-human entities with which we share a fundamental existence.

Interdependency

Understanding our interdependent relationship with technology begins by conceiving technology as an entity that has the capability to construct the social milieu in which we live and changes the ways we think about our existence in the world; and as such, has implications for the very concept of what it is to be a human being. This interdependency is a fundamental characteristic of the relationship between humans and technology. For example, in an examination of technology and culture, historian Bruce Mazlish writes "humans evolved from the other animals [into humanity] through a continuous interaction of tool, physical, and mental-emotional changes". [29] As such, continuous interaction with technology is a critical element in the process of human evolution. While tools and technologies have been the *result* of human imagination and ingenuity, it is *through their use* that we have come to continuously reconstruct ourselves and the world in which we live. In this sense, the world is filled with artificially constructed conditions for our lives.

According to psychologist William Johnston, the artificially constructed conditions of our lives equates to a "third nature" – "the formation of ideology and cultural artifacts which yielded a shift to self-reflective, symbolic thought and agrarianism in humans some 8–40 thousand years ago". [30] Johnston argues that technology plays a major role in the evolution and forming of the third nature and consequently, influences the manner in which we perceive other forms of nature. As humans, we are interdependently involved in the process of creating new technologies that continuously reshape the conditions in which we live. While acting as both *makers* and *users* in this third nature, as biological entities, we also belong to the second nature of emergent life forms. This dual membership in second/third natures implies that as human beings we find ourselves in a continuous process that incorporates our biological body (nature) with manufactured artifacts (culture). In the face of accelerated technological development, the third nature has extended dramatically; to the point that now, any place that is inhabited by human beings can be identified as a constituent part of the third nature.

As a product of this *interdependent* relationship, technology reciprocally shapes and influences our actions and practices. Technology mediates human experience and changes how we perceive the world. For the philosopher Don Ihde technology transforms human experience through "inclinations" that have a powerful cultural variant. [31] Ihde argues that technology mediates our perception and interpretation of reality (the hermeneutic dimension) as well as the manner in which we engage with lived reality (the pragmatic dimension). [32] Ihde contends that there are different types of relations that occur between humans and technology. He

identifies these relations as: “embodied”, “hermeneutic”, “alterity”,⁴ and “background” relations. In an embodied relation, we use devices to experience our *lifeworld* that, by default, simultaneously alter and modify our perception of the world; whereas, an hermeneutic relation involves using instruments that must be interpreted to be properly understood (for example, clocks, thermometers, and other technologies with visual displays). Alterity relations occur when technologies appear as the ‘other’, that is, they possess what might be described as an independence from humans (for example, robots, artificial life and artificial intelligence). Finally, background relations with technology form the context of experience that is seldom raised to a conscious level, as, for example, in the mundane context of a home system using lighting, heating, and cooling systems. [33]

With respect to the type of interdependent relationship we form with digital technology in a ubiquitous computing context, we argue that it is important to foreground the pragmatic – often prosaic or even mundane – dimensions of technological mediations that are often overlooked, not least due to various design factors that render computational systems transparent. These factors include the miniaturization of computer hardware, the immateriality of software and the development of various detection or sensor systems designed to monitor and track human interactions.

Familiar (noun): A demon often said to assume the form of an animal [1]

Interdependence implies that both humans and technology are cooperative partners, and that their relationship is reciprocal. In this respect, human-technological interdependency is analogous to the manner in which traditional Eastern philosophies such as Taoism, Buddhism, and Confucianism seek to harmonize an organic relationship between people and nature. Unlike a Western understanding of interdependency as a background relation (as described by Ihde), [34] a traditional Eastern philosophical understanding of human-technological interdependency is realized overtly and *foregrounded* in everyday cultural activities.

It is common practice in traditional Korean culture to foreground the interdependency between humans and non-humans in all forms of daily activities and routines through cultural expressions designed to signify that we live with ‘others’. By example, commemorative rituals in Korea are ancestor-worship ceremonies held at different intervals. In the common annual ancestral rite, *Jeasa* (제사), a single ceremonial meal is prepared in the belief that the ancestral spirits visit the human beings on Earth to eat the food. This event both evokes the

relationship to the ancestors and reinforces the fellowship Koreans have.

The food arrangement in *Jeasa* accords with the philosophy of Yin-Yang and the five elements. The color and shape of the ingredients that comprise the meal match the five elements—green, red, yellow, white and black, and their placement on the table follows the positive–negative balance of Yin-Yang, see Fig. 1. The most important aspect of this rite is that the physical form is designed to remind participants that there is something beyond the physical world—life and death, material and immaterial, body and spirit. Koreans believe that there are spiritual beings beyond the physical world that influence our present condition. It is believed that when the living take good care of the dead, the spirits will provide for the living if they (the living) encounter hardship or face significant problems in their mortal lives.



Fig 1. Traditional *Jeasa* ritual in head house of Jeonju Jung Clan, 2009, copyright National Intangible Heritage Center, Released under Korea Open Government License (KOGIL BY).

Non-human agents include nature, animals, and technology, as well as immaterial entities such as the spiritual beings experienced in *Jeasa*. Another common characteristic specific to Korean cultural practices foregrounds various forms of otherwise mundane activities. This occurs as part of the Korean culture’s creative strategy to refocus attention on the materiality and immateriality of otherness to evoke a sense of technology-being-with-us.

In casting light on these themes with regards to digital technologies and systems, we argue that specific local cultural and material practices present an alternative lens through which to consider the interrelationships between humans and technology. In traditional Korean culture, the relationship between humans and non-human entities – such as the natural environment, animals and spiritual beings – is reflected through various cultural practices, including culinary art, commemorative rituals and folk painting. These interrelationships are complex and highly nuanced, frequently misinterpreted or simply

⁴ Alterity refers to the radical difference posed to humans as ‘others’. Ihde borrows this notion of alterity from the philosopher Emmanuel Levinas to delineate ‘how and to what extent do technology become other or, at least, quasi-others’. [35]

dismissed in the West.⁵ To illustrate: we can briefly point to *Minhwa* (민화), a specific type of folk painting created by laypeople rather than professional artists. This form of painting was developed in the seventeenth century to reflect on the life of ordinary people and their relationships in the world with other people, animals, everyday objects and the natural landscape, see Fig 2. The main use of *Minhwa* is decorative, and is applied to the adornment of objects such as hand-held folding fans, Byung Pyung (a movable folding wall or screen), and spaces such as a door to a room. *Minhwa* is considered to have a magical dimension. Through *Minhwa*, Koreans possess beneficial virtues such as protecting the owner of a house and their family from an evil force or to help overcome the fear of menacing beings such as tigers. *Minhwa* reminds Koreans that human beings live with other material and immaterial beings, including spiritual beings (good or bad). Koreans use *Minhwa* as a means to express the beliefs and desires of the virtue of spiritual beings or non-human entities. Without recognizing this strong belief in both the existence of spiritual beings and Koreans people's interdependent relationship with them and other non-human entities, *Minhwa* can all too readily be dismissed as a mere surface, a visual description of the natural world.



Fig 2. *Tiger and Magpie*, n.d, copyright National Museum of Korea, Korea Open Government License (KOGL BY, NC).

In Japanese culture other distinctive cultural rituals inform the relationships humans have with non-human entities and technologies. For example Deleuze and Parnet remind us that the “arts of Zen, archery, gardening or taking tea, are exercises to make the event surge forth and dazzle on a pure surface”. [36] They observe that these activities are designed and staged with the purpose of focusing upon the very mundane action being performed. In doing so, these ritualized activities present opportunities to contemplate the entangled connections that exist as part of our interaction with nature and non-living – often technical – entities such as the bow and arrow, the tree, flower or tea. These cultural practices evoke a sense of interdependence between humans and non-human entities to prompt us to question not only how we use technology but moreover how we *perform, ritualize and enact technologies*.

Translated to contemporary art, the influential work of Nam June Paik exemplifies how the themes considered in this paper are rearticulated into the cultural practice of media art. The distinctive ways in which Paik's work reflected on technology articulates a human-technological “assemblage”. [37] By imploring viewers to consider what technology means to our human nature, he emphasized the mediating role of technology. [38] It is important to acknowledge how Paik's articulation of the human-technological assemblage was particularly informed by Korean food culture. According to Paik's wife, Shigeo Kubota, Paik loved traditional Korean food and used to observe that his artworks were similar to Korean *Bibimbap*. [39] *Bibimbap* (비빔밥) is a signature Korean recipe that is infused with the ideology of the world (Yin and Yang and the five elements). The word “*Bibim*(비빔)” literally means “to mix”, an important point that will be explored further below. *Bibimbap* is represented as a symbol of the wisdom of the Korean ancestors in pursuit of harmony in nature and social behaviors. *Bibimbap* is a large bowl of rice topped with various vegetables such as bean sprouts, zucchini, squash, thin strips of beef, a fried egg and paprika paste. In its preparation, each topping ingredient is cooked according to its “nature” to sustain its distinctive taste. The overall combination of the various ingredients is selected based on the harmony that embodies the Korean belief that each food ingredient contains the characteristic Yin-Yang, and the five elements. Once prepared, the toppings are mixed together with rice and eaten with a spoon. When all the ingredients are mixed, *Bibimbap* delivers a new flavour; however, it does not do so at the expense of the individual distinctive flavours because the taste of each ingredient is sustained. The art of making *Bibimbap* is to produce a flavour that both closely maintains the flavour of the unique elements but also connects the other elements to simultaneously produce a new flavor, see Fig. 3.

⁵Japanese author and politician Inazo Nitobe makes a similar claim in his seminal text *Bushido: The Soul of Japan*, written in 1900.



Fig 3. Jeonju bibimbap, n.d, copyright the City of Jeonju, Korea, Reprinted with permission.

Paik's approach to video art shared features with this traditional Korean dish by representing the qualities of a "mixed up, convergence and hybridity". [40] For Paik, Bibimbap was a twofold concept. First, it informed his stylistic strategy, and second, it offered an aesthetic language through which he could express his perception of technology, the electronic medium in particular. The uniqueness of Paik's oeuvre is derived from this concept, embodying the manner in which the characteristics of each element could be sustained while simultaneously mixing together each element to create a new form. In works such as *TV Rodin* (1982) and *Exposition of Music – Electronic Television* (1963), Paik mixed familiar yet unrelated components (e.g. television sets, sculptural forms—such as statue of the Buddha and an imitation of Rodin's *The Thinker*—and musical instruments such as the cello and piano) into new combinations that reflect on the relationship between humans and technology. For Paik the humanization of technology was a major theme informing his practice:

The real implied issue in "art and technology" is not to make another scientific toy, but how to humanize the technology and the electronic medium, which is progressing rapidly—too rapidly. Progress has already outstripped ability to program ... TV Brassiere for Living Sculpture (Charlotte Moorman) is also one sharp example to humanize electronics ... and technology. By using TV as bra ... the most intimate belonging of human being, we will demonstrate the human use of technology, and also stimulate viewers NOT for something mean but to stimulate their fantasy to look for the new, imaginative and humanistic ways of using our technology. [41]

Paik's highly distinctive creative methodology is a primary source of inspiration for the contemporary Japanese art movement of *Device Art*, [discussed in 42],

in which computer interaction is characterized by *mitate* – "a method to present and read hidden meanings behind what is shown or written." [43] The concept of *mitate* is also analogous to creative strategies in Korean cultural practices in that both draw on an allusive metaphorical expression to deliver a message. The emphasis on the physicality of technology and this metaphorical manner of interaction that is characteristic of this genre of new media art is similar to humans' attitudes towards physical objects in Korea and Japan.

Conclusion

Our relationship with technology has always been an interdependent one. In contemporary culture, computer hardware, software and computational systems mediate all facets of our lives. As networked systems are integrated thoroughly into the constructed environment, the obvious manifestation of these systems is concealed. In the face of technological development associated with digital media, it is something of a paradox that as we form increasingly intimate relationships with new technologies, we become increasingly unaware of their existence. This phenomenon of familiarization is exaggerated through the various culturally reinforced relationships that render these technologies transparent and invisible. The direct consequence of this familiarization is that complex relationships between humans and digital technology are no longer in the foreground of our conscious perception, as they once were. In this paper, we discussed processes that 'defamiliarize' our complex and intermingled relationship with digital technologies and computational systems. Defamiliarization – making the familiar unfamiliar again – enables us to refocus our attention in such a way that we are better able to identify the particular relationships of the familiar object within a particular social milieu.

As part of this discussion, we explored cultural difference to examine our interdependent relationship with technology through both a 'Western' and an 'Eastern' perspective. In doing so, we raised the proposition that ubiquitous digital media systems be reformulated into culture by adopting a non-Western approach to defamiliarize these media systems. Unlike a Western understanding of interdependency as a background relation, an Eastern understanding of human–technological interdependency is realized overtly and foregrounded in the form of everyday cultural activities. Finally, we discussed how traditional Korean values foreground the interdependency between humans and non-humans in all forms of daily activities and routines through exaggerated expressions designed to signify that we live with 'others'. Encompassing culinary art to commemorative rituals to folk painting, traditional Korean practices such as these exemplify the importance of communality in Korean culture and give rise to distinctive forms of expression. The most important aspect of these cultural practices is that physical artifacts are designed to remind participants of our interdependent relationships with non-living entities by defamiliarizing

and re-articulating familiar objects and environments to remind and re-awaken an appreciation of "technology-being-with-us".

References

- Koichi Iwabuchi, "Against Banal Inter-nationalism," *Asian Journal of Social Science* 41, (2013): 437-452.
- Koichi Iwabuchi, *Recentering globalization: popular culture and Japanese transnationalism* (Durham; London: Duke University Press, 2002).
- Oxford English Dictionary, "Familiar", accessed 23 December 2015, <http://www.oxforddictionaries.com/definition/english/familiar>
- Mark Weiser, "The computer for the 21th century," *ACM SIGMOBILE Mobile Computing and Communications* 3 (3), (1999): 3-11.
- Anne Galloway, "Intimations of Everyday Life: Ubiquitous Computing and the City," *Cultural Studies* 18 (2-3), (2004): 400.
- Adam Greenfield, *Everyware: the dawning age of ubiquitous computing* (Berkeley: New Riders, 2006), 11.
- Slavoj Žižek, *Organs without Bodies: On Deleuze and Consequences* (New York: Routledge, 2004), 18.
- Mitchell Whitelaw, "Transmateriality: Presence Aesthetics and the Media Arts," in *Throughout*, ed. Ulrik Ekman (London; Cambridge: The MIT Press, 2013), 223.
- Mitchell Whitelaw, "Transmateriality: Presence Aesthetics and the Media Arts," 229.
- Christiane Paul, *Digital Art* (New York: Thames & Hudson, 2008).
- Duncan Shingleton, "Object Geography: The Internet of Things," *ISEA 2011, Istanbul, Turkey*, accessed 26 December 2015, <http://isea2011.sabanciuniv.edu/paper/object-geography-internet-things>.
- Bertram C. Bruce and Maureen P. Hogan, "The disappearance of Technology: Toward an Ecological Model of Literacy," in *Handbook of literacy and technology: Transformations in post-typographic world*, ed. David Reinking, Michael C. McKenna, Linda D. Labbo and Ronald D. Kieffer (Florence: Routledge, 1988), 297.
- Bertram C. Bruce and Maureen P. Hogan, "The disappearance of Technology: Toward an Ecological Model of Literacy," 299.
- Anthony Dunne and Fiona Raby, *Design Noir: The Secret Life of Electronic Objects* (Basel: Birkhäuser, 2001), 8.
- Marx, Leo, "Technology: The Emergence of a Hazardous Concept," *Technology and culture* 51(3), (2010): 576.
- Marx, Leo, "Technology: The Emergence of a Hazardous Concept": 576.
- Marx, Leo, "Technology: The Emergence of a Hazardous Concept": 577.
- Evgeny Morozov, *To Save Everything, Click Here – The Folly of Technological Solutionism*, (PublicAffairs: New York; 2013), 318
- Anthony Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience and Critical Design* (London; Cambridge: The MIT Press, 2008), 2.
- Bernard Waites, "Everyday Life and the Dynamics of Technological Change," in *Science, Technology and Everyday Life, 1870-1950*, ed. Colin Chant (London: Routledge, 1989), 31.
- Anthony Dunne, *Hertzian Tales: Electronic Products, Aesthetic Experience and Critical Design*, 2.
- Evgeny Morozov, *To Save Everything, Click Here – The Folly of Technological Solutionism*, xiv
- Evgeny Morozov, *To Save Everything, Click Here – The Folly of Technological Solutionism*, xiii
- Evgeny Morozov, *To Save Everything, Click Here – The Folly of Technological Solutionism*, xiv
- Gregory Bateson, *Steps to an Ecology of Mind: Collected Essay in Anthropology, Psychiatry, Evolution, and Epistemology* (Chicago: University of Chicago Press, 2000), 142.
- Gregory Bateson, *Steps to an Ecology of Mind: Collected Essay in Anthropology, Psychiatry, Evolution, and Epistemology*: 436.
- Lawrence Crawford, "Viktor Shklovskij: Différance in Defamiliarization", *Comparative Literature* 36(3), (1984): 209.
- Victor Shklovsky, "Art as Technique," in *Russian Formalist Criticism: Four Essays*, ed. Lee T. Lemon and Marion J. Reis (London: University of Nebraska Press, 1965), 12.
- Bruce Mazlish, 'The fourth Discontinuity,' *Technology and Culture* 8, (1967): 4.
- William A. Johnston, "Third Nature: The Co-Evolution of Human Behaviour, Culture, and Technology," *Nonlinear Dynamics, Psychology, and Life Science* 9(3), (2005): 235.
- Arun Kumar Tripathi, "Culture of Embodiment and Technology Reflection," *Child Research Net*, (2009): 9, accessed 26 December 2016, <http://www.childresearch.net/RESOURCE/RESEARCH/2009/exfile/TRIPATHI.pdf>.
- Arun Kumar Tripathi, "Culture of Embodiment and Technology Reflection", 10.
- Don Ihde, *Technology and the Lifeworld: From Garden to Earth* (Bloomington; Indianapolis: Indiana University Press, 1990).
- Don Ihde, *Technology and the Lifeworld: From Garden to Earth*, 98.
- Don Ihde, *Technology and the Lifeworld: From Garden to Earth*, 108.
- Gilles Deleuze and Claire Parnet, *Dialogues II*, trans. Hugh Tomlinson and Barbara Habberjam (New York: Columbia University Press, 2007), 68.
- Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia*, trans. Brian Massumi, (Minneapolis: University of Minnesota Press, 1987).
- Jaehee Kim, "Beyond Cybernetics on Transductivity of Technology and Art," in *Ecological Thinking*, ed. Seoungun Kim, (Seoul: Nam June Paik Art Center, 2010).
- Mi-seok Koh, "Bibimbap and convergence (2012)." Accessed 1 April 2016 <http://english.donga.com/srv/service.php?3?bid=201212801838>
- Yongwoo Lee, "Hybridity and Anonymity," in *Nam June Paik: Fluxus und Videokultur*, ed. C. Brockhaus (Dusseldorf:er: Stiftung Wilhelm Lehmbruck Museum, 2002), 40-49.
- Nam June Paik, "Fine Art-Mechanical Art-Art-Craft-E.A.T. 'Some More Beginnings' Exhibition". *Bijutu Techo*, 309, (1969): 112-132.
- Indae Hwang, Mark Guglielmetti and Vince Dziekan, "Super Natural: Digital Life in Eastern Culture", (SIGGRAPH Asia Conference, 2015), available at www.markguglielmetti.com/writings/.
- Machiko Kusahara, "Externalising our body: Device Art and its experimental nature," *MutaMorphosis: Challenging Arts and Sciences Conference Proceedings*, 2009, accessed 26 December 2015, <http://mutamorphosis.wordpress.com/2009/02/24/externalising-our-body-device-art-and-its-experimental-nature/>.